# Effect of adult attention-deficit hyperactivity on disability and quality of life of bipolar patients

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#### Background

Attention-deficit hyperactivity disorder (ADHD) is a common psychiatric disease, usually first diagnosed during childhood or adolescence. A significant portion ( $\sim$ 50–65%) of ADHD symptoms persist into adulthood. Adult ADHD and bipolar disorder (BD) are common comorbid psychiatric conditions. Comorbidity between BD and adult ADHD has been reported in both ADHD and BD cases.

#### Aim

To determine the effect of comorbid adult ADHD on disability and quality of life of patients with bipolar disorder.

#### Patients and methods

This is a cross-sectional study that was done at the Psychiatric Department in the Zagazig University Hospitals, Sharkia Governorate, Egypt, during the period from May to November, 2017. One hundred and two euthymic patients with *Diagnostic and statistical manual of mental disorders*, 4th ed. – text revision diagnosis of BD I were selected by simple random probability sampling from the patients with bipolar disorder who came for follow-up and to receive their medications from psychiatric outpatient clinic.

# Results

The mean age of the participants ranged from 18 to 40 years, and 51% were female. Patients with bipolar disorder with adult ADHD had more disability in work, social life, and family life than patients with pure bipolar disorder. Moreover, patients with bipolar disorder without adult ADHD had significant better quality of life in all domains as reflected by higher scores in WHO quality-of-life scale than patients with adult ADHD.

#### Conclusion

Adult ADHD is a frequent comorbid disorder in patients with BD. Adult ADHD comorbidity negatively affects functioning and quality of life of patients with BD.

#### **Keywords:**

Attention-deficit hyperactivity disorder, bipolar disorder, disability and quality of life

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# Introduction

Attention-deficit hyperactivity disorder (ADHD) is neurodevelopmental early-onset disorder an characterized by developmentally inappropriate symptoms inattention, hyperactivity, in and impulsivity (American Psychiatric Association, 2013) that affects 5% of childhood population (Polanczyk et al., 2007) and persists into adulthood in up to 50% of the cases (Ramos-Quiroga et al., 2006; Torres et al., 2017).

Bipolar disorder (BD) is a common, complex, and recurrent severe mental health condition with progressive social and cognitive function disturbances and comorbid medical problems. It is characterized by mania or hypomania with overactivity, disinhibited behavior, and elation, interspersed with episodes of depression characterized by profound loss of motivation and interest (Miller, 2016). The first reports on ADHD in adults can be traced to the middle 70s when investigators at the University of Utah, led by Paul Wender, started to develop the Utah Criteria for the diagnosis of ADHD based on the study of adults (Wood *et al.*, 1976). Since then, accumulating data have noted that a significant proportion of children affected by the disorder continue to present ADHD symptoms and associated impairment during adulthood (Barkley, 2009; Biederman *et al.*, 2011).

Adult ADHD and BD are commonly comorbid psychiatric conditions (Wang *et al.*, 2017). Comorbidity between BD and adult ADHD has

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been reported in both ADHD (Klassen et al., 2010) and BD cases (Song et al., 2015).

The reported rates of comorbid BD and adult ADHD are extremely variable, ranging from 5.1 to 47.1% (McGough *et al.*, 2005) for BD in ADHD and 9.5 to 21.2% (McIntyre *et al.*, 2010; Kumar and Varambally, 2017) for ADHD in BD cohorts.

Other clinical studies showed that comorbidity rates of adult ADHD in patients with bipolar disorder range from 5 to 23% (Ryden *et al.*, 2009).

Factors influencing course and outcome include general cognitive ability, severity of ADHD, causal factors (genes and environment), brain maturation and development, and the presence of co-occurring mental health and neurodevelopmental disorders (Faraone *et al.*, 2015). Protective factors, such as exercise, might also have an important role (Rommel *et al.*, 2013).

# Patients and methods Patients

One hundred and two euthymic patients (50 males and 52 females) diagnosed with bipolar I disorder according to a *Diagnostic and statistical manual of mental disorders*, 4th ed. – text revision (DSM-IV-TR) were included in the study. Patients did not show any manic or depressive symptoms at the time of the assessment (Young Mania Rating Scale score <7 and Hamilton Depression Rating Scale <8) and were recruited from the psychiatry outpatient clinic during their regular follow-up.

# Inclusion criteria

The included patients were of both sexes, with age ranged from 18- to 40-year old to avoid a retrospective ADHD diagnosis time that was potentially too long to minimize recall bias, and were willing to participate in the study.

# **Exclusion criteria**

The following were the exclusion criteria: current depressive or manic symptoms, current psychotic disorders, clinically significant medical condition that might have a psychiatric manifestation, diagnosis of intellectual disability, and unwillingness or inability to comply with assessment.

#### Methods

(1) Collection of sociodemographic and clinical data of patients was done by a semistructured

questionnaire specifically developed for this study and employed to obtain sociodemographic

information of patients and clinical characteristics of the disorder.

- (2) Screening for ADHD was done as follows:
  - (a) Adult ADHD self-rating scale (ASRS, version 1.1) symptom checklist was used for ADHD screening based on DSM-IV-TR criteria for adult ADHD. This instrument was intended to assess ADHD by means of 18 items exploring the symptoms reported during the previous 6 months, based on the DSM-IV-TR criteria (Kessler*et al.*, 2005). Obtaining at least four out of first six items can be considered suggestive for a current ADHD.
  - (b) Wender-Utah Rating Scale (WURS) which used to screen for ADHD during childhood. WURS is a 25-item self-administered retrospectively instrument, measures ADHD-relevant childhood behaviors and symptoms. It is a measure with quinary Likert-type scale including choices from 0 to 4 (0 = none, 4 = severe). The cut-off score for a positive screening of childhood ADHD was established at 46 or higher. This cut-off score correctly identifies 86% of patients with ADHD, 99% of normal subjects and 81% of depressed subjects (Wardet al., 1993). The Arabic version used in this study was translated and validated through previous research conducted by (Abdelkarimet al., 2015). It was found that the concomitant use of WUR in addition to ASRS considerably improved the reliability to detect ADHD subjects thus suggesting that in psychiatric populations the use of both scales give better results (Daigreet al., 2014).
  - (c) Additionally, clinical assessment was conducted with each patient who was positive in both ASRS and WURS to confirm the diagnosis of ADHD on the basis of the DSM-IV criteria.
- (3) Assessment for disability and quality of life using the following:
  - (a) The Sheehan disability scale (Sheehan, 1983) was applied to patients to assess the level of disability.
  - (b) WHO quality-of-life scale BREF was applied to evaluate the quality of life (Eser*et al.*, 1999).

After the clinical assessment, participants were divided into two groups:

- BD with adult ADHD group (BD+ADHD), which included 22 patients who had positive screening test result at ASRS and fulfilled the DSM-IV-TR criteria for ADHD by clinical diagnostic interview.
- (2) BD without adult ADHD group (BD), which included 80 patients who screened negative in ASRS. This group was subdivided into two groups:
- (3) Only childhood ADHD group (BD+CDHD), which included 16 patients who had positive screening (score of ≥46) at WURS.
- (4) Pure BD, which included 64 patients who had a negative screening at both the ASRS and the WURS scales.

Administrative design:

- (1) Approval was obtained from the Intuitional Review Board (IRB) and Department of Psychiatry, Zagazig University.
- (2) A written consent was taken from the study subjects.

#### Statistical analysis

Epidemiological and clinical variables were compared in patients with and without current ADHD. Data collected were analyzed using the statistical program for social sciences 11.0.1 software (SPSS, 2017) by a professional statistician. The results were considered significant when the probability of error is less than 5% (*P*=0.01). The following tests were done: paired *t* test for independent variables and  $\chi^2$  test for percentages.

#### Results

# Demographic data

Overall, 72.7% of patients with bipolar disorder with comorbid adult ADHD were males and 27.3% were females, with male : female ratio of nearly 2.5 : 1. Most

Table 1	Demographic	data of	the	studied	group
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Variables	<i>N</i> =102
Age (year)	
Mean±SD	32.61±6.16
Range	18–40
Sex [n (%)]	
Female	52 (51)
Male	50 (49)
Marital status [n (%)]	
Single	20 (19.6)
Married	64 (62.7)
Divorced	14 (13.7)
Widow	4 (3.9)
Education years [n (%)]	
Till high school ( $\leq$ 12 years of education)	74 (72.5)
College (>12 years of education)	28 (27.5)
Occupation [n (%)]	
Not working	44 (43.1)
Working	58 (56.9)
Worker	22 (21.6)
Skilled	20 (19.6)
Employer	6 (5.9)
Specialist	10 (9.8)

Table 2 Frequency of adult attention-deficit hyperactivity disorder, bipolar disorder without adult attention-deficit hyperactivity disorder, childhood-only attention-deficit hyperactivity disorder, and pure bipolar disorder among the studied group

Variables	n (%) (N=102)
Adult ADHD (+ve ASRS, +ve WURS)	22 (21.6)
Bipolar disorder without adult ADHD (-ve ASRS)	80 (78.4)
Childhood ADHD only	
+ve WURS only	16 (15.7)
Pure bipolar disorder without ADHD (-ve both ASRS and WURS)	64 (62.7)

ADHD, attention-deficit hyperactivity disorder; ASRS, ADHD self-rating scale.

Table 3 Disability as	reflected by Sheehar	n disability scale	e scores among	patients with an	nd without adult	attention-defici
hyperactivity disorde	r					

Variables	Patients without adult ADHD (N=80)	Patients with adult ADHD (N=22)	t/MW	Р
Work				
Mean±SD	4.48±2.85	5.93±2.76	2.13	0.04*
Range	1–9	3–9		
Social				
Mean±SD	6.18±1.68	7.04±1.59	2.15	0.03*
Range	2–9	5–9		
Family				
Mean±SD	6.5±2.38	7.75±1.53	2.33	0.02*
Range	1–9	5–10		

ADHD, attention-deficit hyperactivity disorder; MW, Mann-Whitney; t, paired t test. \*Significant.

Variables	Patients with pure BD (N=64)	Patients with adult ADHD (N=22)	ents with adult ADHD Patients with childhood only ( <i>N</i> =22) ( <i>N</i> =16)		Р	LSD
Work						
Mean ±SD	4.22±2.78	5.93±2.76	5.73±2.77	4.12	0.02*	0.01* <sup>1</sup> 0.03* <sup>2</sup> 0.83 <sup>3</sup>
Range	1–9	3–9	1–9			
Social						
Mean ±SD	6.09±1.77	7.04±1.59	6.8±1.27	3.19	0.04*	0.03 <sup>*1</sup> 0.04 <sup>*2</sup> 0.62 <sup>3</sup>
Range	2–9	5–9	5–9			
Family						
Mean ±SD	6.41±2.39	7.75±1.53	6.99±2.19	3.10	0.04*	0.02 <sup>*1</sup> 0.04 <sup>*2</sup> 0.22 <sup>3</sup>
Range	1–10	5–10	5–9			

Table 4	Comparison	between	patients	with pure	bipolar	disorder,	patients	with adul	t attention-	deficit	hyperactivity	disorder	and
patients	with childho	od-only a	ttention-	deficit hy	peractivi	ity disorde	er regard	ing disab	ility				

ADHD, attention-deficit hyperactivity disorder; BD, bipolar disorder. *P*1: patients with pure BD versus patients with adult ADHD. *P*2: Patients with pure BD versus patients with childhood-only ADHD. *P*3: Patients with adult ADHD versus patients with childhood ADHD. *F*, analysis of variance *F* test; LSD, least statistical difference. \*Significant.

Table 5 Quality of life as reflected by WHO quality-of-life scale scores of patients with and without adult attention-deficit hyperactivity disorder

variables	Patients without adult ADHD ( <i>N</i> =80) Patients with adult ADHD ( <i>N</i> =22)		t	Р
Domain 1 (physica	I health)			
Mean±SD	59.1±14.81	47.27±10.27	3.51	0.001**
Range	31–88	31–69		
Domain 2 (psychol	ogical)			
Mean±SD	56.78±15.41	49.45±10.26	2.10	0.04*
Range	44–81	14–75		
Domain 3 (social r	elations)			
Mean±SD	57.1±15.52	48.45±10.27	2.47	0.02*
Range	44–81	14–75		
Domain 4 (environ	ment)			
Mean±SD	53.08±11.74	49±8.76	2.63	0.009**
Range	31–75	38–63		

ADHD, attention-deficit hyperactivity disorder; t, paired t test. \*Significant. \*\*Highly significant.

patients with bipolar disorder with comorbid adult ADHD (90.9%) were educated for less than 12 years of education compared with only 67.5% of patients without adult ADHD, and this difference is statistically significant. There was a statistically significant difference between patients with comorbid adult ADHD and patients without ADHD regarding marital status and occupation, as patients with adult ADHD were more frequently unmarried and not working (Table 1).

Frequency of adult ADHD in patients with bipolar disorder was 21.6%, whereas the frequency of childhood ADHD which did not persist into adulthood was 15.7% (Table 2).

#### Disability

Patients with comorbid adult and childhood ADHD had more significant disability in work, social life, and family life than patients with bipolar disorder without ADHD (Tables 3 and 4).

# Quality of life

Patients with bipolar disorder without comorbid ADHD had better quality of life than patients with comorbid adult and childhood ADHD (Tables 5, 6).

#### Discussion

In this study, 102 euthymic patients with bipolar disorder were screened for presence of adult ADHD. Sociodemographic data, clinical data, other comorbid disorders, disability, and quality of life were assessed in patients with bipolar disorder with adult ADHD and compared with patients without adult ADHD to determine the effect of presence of adult ADHD in clinical characteristics and outcomes of BD.

# Frequency of attention-deficit hyperactivity disorder (Table 2)

In the current study, 22 (21.6%) patients with bipolar disorder had adult ADHD. Moreover, 15.7% of the patients had childhood ADHD that did not persist

Table 6	Comparison	between	patients wi	th pure bip	oolar dis	order, p	oatients v	with adul	t attention	-deficit I	hyperactivity	disorder an	d
patients	with childho	od attenti	on-deficit h	yperactivi	ty disore	der rega	<mark>ոrding զւ</mark>	uality of I	fe				

Variables	Patients with pure BD ( <i>N</i> =64)	Patients with adult ADHD (N=22)	HD Patients with childhood ADHD ( <i>N</i> =16)		Р	LSD
Domain 1 (p	physical health)					
Mean ±SD	62.53±13.79	47.27±10.27	45.38±10.28	19.4	<0.001**	$\substack{<0.001^{**1} < 0.001^{**2} \\ 0.58^3 }$
Range	31–88	31–69	31–63			
Domain 2 (p	osychological)					
Mean ±SD	58.25±15.51	49.45±10.26	50.88±13.9	3.96	0.02*	0.02 <sup>*1</sup> 0.04 <sup>*2</sup> 0.72 <sup>3</sup>
Range	44–81	14–75	25–69			
Domain 3 (s	social life)					
Mean ±SD	58.66±15.62	48.45±10.27	50.88±13.9	5	0.009**	$0.005^{**1} 0.04^{*2} 0.54^3$
Range	44–81	14–75	25–69			
Domain 4 (e	environment)					
Mean ±SD	53.97±10.29	49±8.76	48.3±10.26	3.34	0.04*	$0.04^{*1} 0.04^{*2} 0.82^{3}$
Range	31–75	38–63	31–62			

ADHD, attention-deficit hyperactivity disorder; BD, bipolar disorder. *P*1: patients with pure BD versus patients with adult ADHD. *P*2: Patients with pure BD versus patients with childhood-only ADHD. *P*3: Patients with adult ADHD versus patients with childhood ADHD. *F*, analysis of variance *F* test; LSD, least statistical difference. \*Significant. \*\*Highly significant.

into adulthood, whereas 62.7% of patients had pure BD without ADHD. These frequencies of ADHD were in line with previous studies. The frequency of adult ADHD varied across the studies: 23.3% (Karaahmet *et al.*, 2013), 21.7% (Perroud *et al.*, 2014), 19.8% (Perugi *et al.*, 2013), 17.6% (McIntyre *et al.*, 2010), 16.4% (Ryden *et al.*, 2009), 16.3% (Tamam *et al.*, 2008), and 10.5% (Torres *et al.*, 2015).

The thorough methodology used to diagnose a concurrent ADHD with BD in previous studies may be a reason for this variance of prevalence of ADHD among the studies.

#### Regarding disability (Tables 3 and 4)

Clinical research has widely demonstrated that BD may present functional impairment at some point or permanently during the course of the illness (Bonnín *et al.*, 2014). However, in ADHD, the research on functioning is a relatively immature area, especially in adult populations, and even fewer in patients with comorbid BD+ADHD (Torres *et al.*, 2017).

Regarding disability, patients with comorbid adult and childhood ADHD had more disability in work, social life, and family life than patients with bipolar disorder without ADHD. This finding is in consistent with previous reports (Nierenberg *et al.*, 2005; Biederman and Faraone, 2006; Garcia *et al.*, 2012).

Nierenberg *et al.* (2005) showed that patients with bipolar disorder with adult ADHD presented poorer functioning evaluated by means of the Global Assessment of Functioning compared with patients with bipolar disorder without ADHD.

Koc and Kesebir (2014) found that global functioning of patients with pure BD was higher than patients with comorbid ADHD, which indicates that the presence of ADHD comorbidity affects functioning negatively.

Increased numbers of episodes and severity, which are caused by the presence of comorbid ADHD, with presence of other comorbidities may cause deterioration in functioning in BD cases (Sanchez-Moreno *et al.*, 2009).

Peurgi et al. (2013) found that patients with BD with and without ADHD had similar impairment in global, work, and social functioning, whereas ADHD-positive patients were significantly more impaired in familial adjustment than ADHD-negative patients. Wang et al. (2017) reported that severity of the comorbid BD and ADHD was associated with poor family environment, such as lower socioeconomic state, poor familial emotional support, and low satisfaction with familial relationships. Because this study used a cross-sectional design, it could not determine any causal relationship between increased comorbidity and poor family environment. One explanation is that poor socio-environmental factors might lead to higher rates of this comorbidity. Another is that experiencing the comorbid condition might cause people to regard their socio-environmental state as poor. A third is that psychiatric problems in family members might worsen people's socio-environmental status (Wang et al., 2017).

At this study, there was no statistical significant difference regarding disability between patients with comorbid adult ADHD and patients with comorbid childhood-only ADHD.

#### Regarding quality of life (Tables 5 and 6)

This study found that patients with bipolar disorder without comorbid ADHD had better quality of life, which is reflected in higher scores of WHO quality-oflife scale than patients with comorbid adult and childhood ADHD. Nierenberg *et al.* (2005) also showed that patients with BD and ADHD had lower quality of life compared with patients without ADHD.

Koc and Kesebir (2014) found that patients with pure BD had higher scores in all domains of life quality (social, physical health, environmental, and psychological) than patients with comorbid ADHD. These findings suggested that ADHD comorbidity negatively affects quality of life in patients with BD.

At this study, it was found that the group of patients with bipolar disorder with childhood-only ADHD had poorer quality of life than patients with pure BD, but they did not differed significantly from those patients with adult ADHD.

# Conclusion

- (1) Adult ADHD is a frequent comorbid disorder in patients with BD.
  - (a) Comorbid adult ADHD in patients with BD is associated with earlier age of onset, longer duration of illness, more mood episodes, more frequent psychotic features during mood episodes, noncompliance to medications, more times of hospitalization, and more suicidal attempts.
  - (b) Adult ADHD comorbidity negatively affect functioning and quality of life of patients with BD.

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# **Conflicts of interest**

There are no conflicts of interest.

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